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tegrals," with special reference to Fourier's series and integrals; the second with the "Conduction of heat." It is expected that the first volume will appear early next year and the second in the course of that year.

We have received the first fifteen numbers (May, 1919–July, 1920, 12 numbers to a volume) of the Spanish monthly periodical *Revista de Matematicas y Fisicas Elementales*, "designed for secondary, normal, special and higher schools," and published at Buenos Aires. Each number contains short articles (for example on "The indefinite integral," "An artifice in successive approximations," "Trial in classification of cubics," "Logarithmic calculation"), Notes, Miscellanea (a collection of statements of theorems and historical notes), Bibliography (brief reviews, contents of periodicals, titles of new books), Questions and discussions, and Problems proposed and solved—The publication at Buenos Aires of the bimonthly *Revista de Matematicas* ceased in February, 1918, with the concluding number of the second volume.

ARTICLES IN CURRENT PERIODICALS.

AMERICAN JOURNAL OF MATHEMATICS, volume 42, no. 2, April (published in July), 1920: "On the convergence of certain classes of series of functions" by R. D. Carmichael, 77–90; "On the solution of linear equations in infinitely many variables by successive approximations" by J. L. Walsh, 91–96; "Self-dual plane curves of the fourth order" by L. E. Wear, 97–118; "On the groups of isomorphisms of a system of Abelian groups of order p^m and type $(n, 1, 1, \cdots, 2)$" by L. C. Mathewson, 119–128; "On the satellite line of the cubic" by R. M. Winger, 129–135.

BOLLETINO DI BIBLIOGRAFIA E STORIA DELLE SCIENZE MATEMATICHE, second series, volume 2, 1919, no. 1: [Authorized translation into Italian of L. C. Karpinski's article "The History of Science" in *School and Society*, December 21, 1918 [*1919*, 163]], 15–27.—No. 2: Review by G. L[oria] of D. E. Smith's edition of De Morgan's *Budget of Paradoxes* (Chicago, 1915), L. C. Karpinski's *Robert of Chester's Latin Translation of the Algebra of Al-Khowarizmi* (New York, 1915), and of R. C. Archibald's *Euclid's Book on Divisions of Figures* (Cambridge, 1915), 38–41 and 43–44; Review by G. Vivanti of M. Bôcher's *Leçons sur les méthodes de Sturm dans la théorie des équations différentielles* (Paris, 1917) and of H. Hancock's *Theory of Maxima and Minima* (Boston, 1917), 46–49; Brief notes on the following articles by scholars in America: "Pierre Laurent Wantzel," "Plans for a history of mathematics in the nineteenth century," and "Origin of the name 'mathematical induction'" by F. Cajori; "The rôle of the concept of infinity in the work of Lucretius" by C. J. Keyser; "The teaching of the history of science" by G. Sarton; and "Medicine and mathematics in the sixteenth century" by D. E. Smith, 58–64.

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 26, no. 10, July, 1920: "The April meeting of the American Mathematical Society in New York" by F. N. Cole, 433–444; "Stieltjes derivatives" by P. J. Daniell, 444–448; "Sheffer's set of five postulates for Boolean algebras in terms of the operation 'rejection' made completely independent" by J. S. Taylor, 449–454; "Rotation surfaces of constant curvature in space of four dimensions" by C. L. E. Moore, 454–460.

BULLETIN OF THE CALCUTTA MATHEMATICAL SOCIETY, volume 10, no. 4, March, 1920: "On the diffraction of light by a transparent wedge" by S. Banerji, 199–206; "On a geometrical treatment of the scattering of light by a perfectly reflecting cone" by A. Datta, 207–212; "A note on the deformation of surface" by B. Sen, 213–218; "On the stability of two co-axial rectilinear vortices of compressible fluid" by B. Datta, 219–228; "On some properties of natural numbers" by H. Datta, 229–238; "A note on Whittaker's formula for the solution of algebraic or transcendental equations" by B. Pal, 239–242; Review by A. C. Bose of C. E. Cullis's *Matrices and Determinoids* (2 vols., Cambridge, 1913–1918), 243–256.

ENSEIGNEMENT MATHÉMATIQUE, volume 21, no. 1, June 1920: "Comment un conservateur pourait-il arriver au seuil de la mécanique nouvelle?" by T. Levi-Civita, 5–28 (conference at the mathematical seminary of the University of Rome, March 8, 1919); "Remarques sur la théorie des ensembles et les antinomies cantoriennes, II" by D. Miriamanoff, 29–52; Les deux suites Fibonacciennes fondamentales (u_n) (v_n); tables de leurs termes jusqu'à $n = 120$" by C. A. Laisant, 52–56; "C. A. Laisant (1841–1920)" by H. Fehr, 57; Mélanges, Chronique, 58–63; Review of D. E. Smith's *Number Stories of Long Ago* (Boston, 1919), 67–68.

HERMATHENA, no. 42, 1920: "Heron's formula for cube root" by J. G. Smyly, 64–67; "Some examples of Greek arithmetic" by J. G. Smyly, 105–114.

ISIS, volume 3, January, 1920: "The purpose of Zeno's arguments on motion" by F. Cajori, 7–20.

JOURNAL OF THE INSTITUTE OF ACTUARIES, volume 52, April, 1920: "An elementary demonstration of Stirling's approximate formula for the value of factorial n" by G. J. L., 102–106.

MATHEMATICS TEACHER, volume 12, no. 4, June, 1920: "Some helps and hindrances in teaching mathematics in the secondary schools" by L. E. Lynde, 139–153; "The effect of post-armistice conditions on mathematical courses and methods" by H. English, 154–166; "Teaching practical mathematics efficiently" by C. H. Sampson, 167–171. "New Books," 172–174.

NATURE, volume 105, June 10, 1920: "The approximate evaluation of definite integrals between finite limits" by A. F. Dufton, 455–456—June 17: "A new method for approximate evaluation of definite integrals between finite limits" by T. Y. Baker, 486—July 1: "Use of Sumner lines in navigation" by T. H. Tizard, 552–554; "Dr. F. A. Tarleton" by R. A. P. Rogers, 554; "British aëronautics," 561–562.

PHILOSOPHICAL MAGAZINE, sixth series, volume 40, July, 1920: "A new reading of relativity" by F. Slate, 31–49; "The bearing of rotation on relativity" by R. A. Sampson, 67–72; "On the measurement of time and other magnitudes" by N. R. Campbell, 161–162.

POPULAR ASTRONOMY, volume 28, no. 6, June–July, 1920: "The theory of relativity" by W. H. Pickering, 334–344,—No. 7, August–September: "John Alfred Brashear, 1840–1920" (portrait frontispiece) by F. Schlesinger, 373–379; "Aintoff's equal area projection of the sphere" by R. L. Faris, 385–386.

PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, volume 55, no. 4, May, 1920: "Orbits from assumed laws of motion" by Arthur Searle, 189–207.—No. 7, June: "Some geometric investigations on the general problem of dynamics" by J. Lipka, 283–322.

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, volume 6, no. 5, May, 1920: "On Kummer's memoir of 1857 concerning Fermat's last theorem" by H. S. Vandiver, 266–269.

REVUE DU MOIS, 15th year, April 10, 1920: "Les mathématiques à l'Université de Strasbourg" by M. Fréchet, 337–362.

REVUE GÉNÉRALE DES SCIENCES, volume 31, June 15, 1920: "Un nouvel appareil pour le tracé des coniques," 329–330 (an account of the conigraph as described in the *Proc. Royal Society*, see this MONTHLY, *1920*, 317); "La géométrie differentielle projective des résaux" by G. Tzitzéica, 349–352 [". . . Cependant, c'est à M. Wilczynski que revient le mérite d'avoir créé une théorie projective, aussi complète que possible, des propriétés infinitésimales des courbes planes, des courbes gauches et des surfaces réglées. Il a employé à cet effet certains invariants et covariants des équations différentielles linéaires du troisiéme et du quatriéme ordre et des systèmes d'équations du second ordre. Il a appliqué aussi une méthode analogue à l'étude des surfaces et des congruences de droites de notre espace.

"Cette méthode a donné de beaux résultats. Toutefois les calculs, un peu longs et compliqués, laissent au second plan, les propriétés géométriques. Aussi, les études synthétiques de quelques géomètres italiens out rendu à cette branche de la géomètrie différentielle un aspect plus intuitif, en y ajoutant de plus la considération des figures dans un espace projectif à plus de trois dimensions."]

REVUE SCIENTIFIQUE, volume 58, June 12, 1920: "L'espace et le temps dans la physique moderne" by L. Bloch, 333–341.—June 26: "La théorie d'Einstein et la nouvelle loi de la gravitation" by J. Bosler, 353–359.

SCHOOL AND SOCIETY, volume 12, August 7, 1920: "An odd method for determining the year of birth" by G. A. Miller, 106–107 [De Morgan's conundrum, "I was x years old in the year x^2."]

SCIENCE PROGRESS, volume 15, July, 1920: "Mathematical philosophy" by Bertrand Russell, 101 [Letter dated April 20; "Sir,—The review of my *Introduction to Mathematical Philosophy* by the late P. E. B. Jourdain, in the April number of *Science Progress*, contains some statements which I cannot pass by in silence.

"In the first paragraph, on p. 673, Mr. Jourdain repeats his complaint that I ignored his attempted proof of the multiplicative axiom. In actual fact, I took endless pains over it. At first, I told him where I thought it faulty; he then sent me a new version, altering other parts, but leaving the vital point unchanged. This process occurred repeatedly. I consulted all competent people whom I could get hold of, and they all agreed with me in thinking the proof invalid. I have read his proof with minute care in its various successive forms; I have written to him over and over again explaining where I thought it faulty; but on this point it has not changed. [Cf. this MONTHLY, *1920*, 44.] Mr. Jourdain was a friend of many years' standing, for whom I had both affection and respect, and I was reluctant to enter into public controversy with him. Therefore when I did not think well of his work I did not mention it. Neither in connection with the multiplicative axiom, nor in any other connection, had I any other motive for not referring to him. This applies in particular to the matter mentioned in the second paragraph of p. 673.

"In conclusion, I must entirely repudiate the statement at the top of p. 672: 'Mr. Russell acknowledged the justice of the present writer's strictures in the *Cambridge Review* on a crop of similar errors, but said they were all due to Dr. Whitehead.' This odious accusation must be based upon some conversation of ten years ago, and I can only base my denial upon the certainty that that is not the sort of thing I should do."]; "A psychological geometry" by F. R. Hoare, 131–134 [First two paragraphs: "It is at first sight somewhat strange that the quantitative and statistical methods from which so much was hoped in biology a generation ago should so far have proved more fruitful and suggestive when applied to the apparently much less measurable phenomena of the mind. Yet the hopes that the early biometricians rested on them have certainly not been realised and their present exponents in biology have had to make practically a fresh start with new groups of phenomena and different objectives. In psychology, on the other hand, their recent developments derive in unbroken succession from the work of such pioneers as Binet, who first employed systematic mental tests and measured the results.

"One of the most purely mathematical of these developments was originated by Professor Spearman in a paper published in 1904 in the *American Journal of Psychology.* Its latest and most curious extensions are described in two papers by Mr. Maxwell Garnett published in the *Proceedings of the Royal Society* (A, 96, 1919) and the *British Journal of Psychology* (May 1919) respectively. What follows is largely an account in non-mathematical language of as much of Mr. Garnett's description as can be so expressed."].

SCIENTIA, volume 27, June, 1920: Review by R. Marcolongo of J. W. Young's *I Concetti fondamentali dell' Algebra e della Geometria con una nota di U. G. Mitchell sullo Sviluppo storico del simbolismo algebrico* translated by D. Mercogliano (Naples, 1919), 482–483—July: Review by G. Loria of L. E. Dickson's *History of the Theory of Numbers,* volume 1 (Washington, D. C. 1919), 42–44.

TÔHOKU MATHEMATICAL JOURNAL, volume 17, nos. 3, 4, May, 1920: "Die Zahl: Einleitung zur Theorie der analytischen Funktionen" by G. Mittag-Leffler, 157–209; "On a transformation theorem relating to spheroidal harmonics" by B. Datta, 210–212; "Theorems on double series" by T. Kojima, 213–220; "On a certain inversion in the theory of numbers" by E. T. Bell, 221–231; "On some central difference formulas of interpolation" by K. Ogura, 232–241; "On the theory of the tides" by K. Ogura, 242–250; "A new interpretation of the Wellstein representation and its application," by T. Ota, 251–261; "Some non-euclidean metric theorems as necessary consequences of the corresponding Euclidean theorems" by T. Ota, 262–270; "The ellipsoid within a right circular cylinder" by T. Hayashi, 271–278; "Note on the theory of integral functions of the first class" by R. D. Carmichael, 279–285; "Note on a transformation of series similar to the principle of inversion in the theory of numbers," by R. D. Carmichael, 286–291; "Flat-sphere geometry, fourth paper" by J. Eiesland, 292–330; "On the 'Chinese theorem'" by S. Wigert, 331; "Groups involving only operators whose orders are divisors of four" by G. A. Miller, 332–338; "Ein Satz über die Borelsche Summation" by M. Fujiwara, 339–343; "Ueber Konvergenzabszisse der Dirichletschen Reihen" by M. Fujiwara, 344–350; "Einige Probleme über konvex-geschlossene Kurven und Flächen" by T. Kubota, 351–362; "Ueber Abelsche erzeugende Funktion und Darstellbarkeitsbedingung von Funktionen in Dirichletsche Reihen" by M. Fujiwara, 363–383.

UNTERRICHTSBLÄTTER FÜR MATHEMATIK UND NATURWISSENSCHAFTEN, vol. 26, nos. 3–4, April 20, 1920: "Die Einführung besserer Zahlwörter" by E. Schülke, 30–31; "Zur Lehre von den Harmonikalen" by J. Moser, 31–33; "Ein Polyedersatz" by H. Wolff, 33–34 [The proposition: "If n points $A_1, A_2, \cdots A_n$, the vertices of a polyhedron lie on a sphere in such a way that its middle point M is the centre of gravity of the A_λ, and if P is any point in space at a distance a from M, then $\sum_{\lambda} PA_\lambda = n(R^2 + a^2)$"]; "Muss die Sonne ihren höchsten Stand immer im Meridian erreichen"? by P. Kiesling, 34–35; "Die Kugel als regelmässiger Vielflächner" by F. Elsas, 36–37; "Zur Maclaurins Trisektrix, zur Kissoide und zur Versiera" by A. Peschke, 37; "Zur Lehre von den harmonischen Strahlen" by J. Mahrenholz, 37; "Ueber eine Beziehung zwischen Normale und Brennstrahlen in einem Punkte einer Ellipse" by J. Mahrenholz, 37–38; Various other brief notes, 38–40.

ZEITSCHRIFT FÜR MATHEMATISCHEN UND NATURWISSENSCHAFTLICHEN UNTERRICHT, volume 51, no. 4–5, published May 20, 1920: "Das d'Hondtsche Wahlsystem." "Eine Anwendung der graphischen Methoden" by E. Sós, 89–93; "Mathematische Betrachtungen über das geltende politische Wahlverfahren" by H. Franke, 94–106; "Arbeit und Boden in der Volkswirtschaftslehre und Mechanik" by J. Braun, 106–109; "Optische Geometrie" by R. Böger, 110–118; "Eine neue Verallgemeinerung des pythagoräischen Lehrsatzes" by A. Voigt, 118–122; "Das Ecktangentendreieck" by J. Mahrenholz, 123; "Der Saccheri-Legendresche Satz lautet: Ist in einem einzigen Dreieck die Winkelsumme $\lesseqgtr$ 180°, so ist sie es in jedem" by K. Fladt, 124–125 [a very simple proof for the Euclidean case, which, however, the author states he has not yet succeeded in extending to the non-Euclidean cases;] "Aufgabenrepertorium," 126–132; "Bücher, besprechungen," 140–141.

UNDERGRADUATE MATHEMATICS CLUBS.

EDITED BY U. G. MITCHELL, University of Kansas, Lawrence.

Last month we gave some account of two new clubs, the "Pascal Circle" of Trinity College, Washington, D. C., and "The Square" of Washington Square College, New York City, which had not been previously reported. This month our readers will note among the "Club Activities" an account of a third new club, "The Cornell Parabola," organized in November 1919 at Cornell University, Ithaca, N. Y.

The editor of this department has recently enjoyed the privilege of examining a copy of the "*Proceedings of the Johns Hopkins University Mathematical Club*, edited by G. Breit and F. V. Morley and printed by Corona Morley." [1]

It is a typewritten volume of about sixty pages, bound in manila paper covers, and reports the nine meetings held in March, April and May, 1920. Many of the formal papers and solutions of problems presented are recorded in full. Others are given in abstract form only. The editors have added to the interest and value of the record by inserting comments and "gleanings" from mathematical literature in connection with the subjects discussed. As an illustration of these "gleanings" we select the following, inserted (p. 34) in connection with a paper on "Quaternions" by Professor Murnaghan:

"'Comparing a Quaternion investigation, no matter in what department, with the equivalent Cartesian one, even when the latter has availed itself to the utmost of the improvements suggested by Higher Algebra, one can hardly

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[1] "Corona Morley" refers, as the reader doubtless recognizes, to Mr. Morley's typewriter. The humorous touch added by this bit of personification is supported throughout by occasional references to Corona as, for example, the following (p. 12):

"No account of Mathematical Prodigies will hereafter be complete without reference to Corona Morley. Barely a week old, she is nevertheless able to talk about the Gamma function. The editors wish the best of success to her acquisitive and expository powers."